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BACKGROUND OF THE INVENTION

The invention relates to a metering device for flowable products, in particular, dairy products, comprising a metering cylinder, a valve cylinder coaxially arranged therein and connected at an upper end to the reservoir, a ring-shaped metering piston movable in the annular chamber between metering cylinder and valve cylinder between an upper intake end position and a lower dispensing end position, wherein the metering piston divides the annular chamber into an upper part connected to the product reservoir and a lower part forming the metering chamber, further comprising a mouthpiece closing the metering chamber at the bottom side with the exception of a coaxial cylindrical dispensing opening, and comprising a central valve piston movable into operating positions releasing or closing the annular chamber according to the preamble of claim 1.

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SUMMARY OF THE INVENTION

The invention solves this problem with a metering device wherein the valve cylinder with the valve piston forms a rotatable control unit that, in a first rotary position, connects the metering chamber with the supply channel in the valve cylinder and, in a second rotary position, connects the metering chamber to an outlet channel ~~having the features of claim 4.~~ With regard to important additional embodiments reference is being had to the dependent claims 2 to 16.

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BRIEF DESCRIPTION OF THE DRAWINGS

With regard to significant further details and advantages of the invention, reference is being had to the following description and drawings in which the metering device according to the invention is explained with the aid of an embodiment. The drawings show in:

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DESCRIPTION OF PREFERRED EMBODIMENTS

In Fig. 1, a filling device for dairy products is illustrated that is identified in its entirety by reference numeral 1 and comprises a product reservoir 3 closed by wall parts 2. Several metering devices 4 are connected to the outlet side of this container 3. In the following, they are differentiated with regard to their different illustrated operating positions only by the reference characters 4.1, 4.2, and 4.3 but are comprised of identical component assemblies with regard to their construction. The metering devices 4 that operate according to the principle of piston metering devices are used for filling cups 5, respectively, wherein the filling device 1 can also be provided as a component of a molding, filling, and sealing machine (not illustrated in detail).

Claims

WHAT IS CLAIMED IS:

1. - 16. (canceled)
17. (new) A metering device for flowable products, the metering device comprising:
 - a metering cylinder;
 - a valve cylinder coaxially arranged in the metering cylinder, wherein the valve cylinder has an upper end and is configured to be connected with the upper end to a product reservoir;
 - an annular chamber defined between the metering cylinder and the valve cylinder;
 - a ring-shaped metering piston arranged in the annular chamber to be moveable between an upper intake position and a lower dispensing position;
 - wherein the metering piston divides the annular chamber into an upper part and a lower part, wherein the upper part is configured to be connected to the product reservoir and the lower part forms a metering chamber;
 - a mouthpiece closing a bottom side of the metering chamber and having a coaxial cylindrical dispensing opening;
 - a central valve piston movable into operating positions releasing or closing the annular chamber;
 - wherein the valve cylinder and the valve piston form of rotatable control unit, wherein the rotatable control unit has a first rotary position for connecting the metering chamber to a supply channel in the valve cylinder and a second rotary position for connecting the metering chamber to at least one outlet channel provided in the valve piston.
18. (new) The metering device according to claim 17, wherein the valve piston constitutes a lower end of the valve cylinder and also a lower end of the supply channel in the valve cylinder, wherein the valve cylinder in an area directly above an upper side of the valve piston is provided with at least one transfer opening, through which, in the first rotary

position of the control unit, a product can be transferred into at least one axial transfer channel having an upper end and a lower end, wherein the upper end communicates with the metering chamber, wherein, in the first rotary position of the control unit, the lower end of the at least one axial transfer channel is closed and, in the second rotary position, is connected to the at least one outlet channel.

19. (new) The metering device according to claim 17, wherein several the at least one transfer opening, several of the at least one axial transfer channel, and several of the at least one outlet channel are provided.

20. (new) The metering device according to claim 17, comprising a support plate, wherein two of the at least one axial transfer channel are provided, wherein the two axial transfer channels are arranged staggered by 180° in the support plate and open at a bottom side of the metering chamber.

21. (new) The metering device according to claim 20, wherein the support plate has an engagement opening for the valve piston, wherein the two axial transfer channels are longitudinal grooves that extend radially away from the engagement opening for the valve piston.

22. (new) The metering device according to claim 21, wherein in a circumferential direction of the engagement opening, the engagement opening has a curved section arranged between the longitudinal grooves, wherein the curved section matches a contour of the valve piston, wherein valve piston rests against the curved section in the first and second rotary positions.

23. (new) The metering device according to claim 21, wherein the longitudinal grooves are covered at a lower end by the mouthpiece.

24. (new) The metering device according claim 21, wherein the valve cylinder has two of the at least one transfer opening, wherein the two transfer openings are formed as wall slots positioned opposite one another and staggered by 180° relative to one another, wherein the wall slots open into the longitudinal grooves, respectively, wherein the valve piston has two transverse openings correlated with the wall slots, wherein the transverse openings open into the at least one outlet channel and are staggered by 90° relative to the

wall slots.

25. (new) The metering device according to claim 24, wherein the mouthpiece has a bottom opening, wherein the control unit in the area of the at least one outlet channel cooperates with the bottom opening, wherein the bottom opening has a flow cross-section that extends across a partial area of an end face of the valve piston.

26. (new) The metering device according to claim 25, wherein the at least one outlet channel in the area between the transverse openings has a longitudinal channel that extends at least partially at a parallel spacing to a longitudinal center axis of the valve piston, wherein the longitudinal channel in the second rotary position of the control unit is at least partially in an overlap position with the bottom opening of the mouthpiece.

27. (new) The metering device according to claim 25, wherein the bottom opening of the mouthpiece extends parallel and at a spacing to a longitudinal center axis of the valve piston.

28. (new) The metering device according to claim 21, wherein that the at least one outlet channel has a longitudinal channel part opening immediately into one of the longitudinal grooves in the support plate.

29. (new) The metering device according to claim 21, wherein the metering chamber in the area near the longitudinal grooves has a radially widened shape.

30. (new) The metering device according to claim 29, wherein the radially widened shape has a length releasing the metering piston when the metering piston is in a lower extended position.

31. (new) The metering device according to claim 17, wherein the control unit is axially movable into an upper service position in which the control unit is at least out of engagement with the mouthpiece.

32. (new) The metering device according to claim 17, wherein the supply channel is a central bore extending in the control unit, wherein the central bore has an upper end remote from the valve piston, wherein the upper end is provided with wall penetrations as connecting openings that open toward the product reservoir.